

CLAIMS:

1. A pair of sunglasses characterized by comprising at least one electro-wetting lens incorporating first and second immiscible fluids of dissimilar light transmission properties, the first fluid being a better light transmitter than the second fluid, wherein variation in the potential difference between first and second electrodes of each electro-wetting lens causes the shape of a boundary between the first and second fluids to alter from a first state in which the second fluid forms a layer across substantially an entire light transmitting area of an internal surface of the lens and light transmission is at a most reduced state to a second state in which light transmission is at a maximum.
- 5 10 2. The sunglasses of claim 1 wherein in the second state the second fluid is confined to peripheral regions of the lens.
3. The sunglasses of claim 1 or 2, wherein the lens comprises a transparent rear wall (110) and a transparent front wall (120) defining a cavity (140) between them, within 15 which the first and second fluids are confined.
4. The sunglasses of claim 3, wherein the first and second electrodes of the lens comprise a rear electrode (160) formed in a region of the internal surface of the rear wall (110) and a ring-electrode (150) which extends around an internal periphery of the front wall (120).
- 20 5. The sunglasses of claim 4, wherein an interior region of the front wall (120) is hydrophobic or coated with a hydrophobic layer (130) whilst the ring-type electrode (150) is hydrophobically insulated.
- 25 6. The sunglasses of any preceding claim, wherein the natural state of the lens is the first state, and in this first state no potential difference is applied between electrodes of the lenses.

7. The sunglasses of claim 6, wherein the first fluid is the fluid nearest the front wall, whilst the second fluid is the fluid having a boundary nearest the rear wall.
8. The sunglasses of claim 6 or 7, wherein the first fluid is a transparent non-conducting fluid, whilst the second fluid is a colored conductive and/or polar fluid.
9. The sunglasses of any of claims 1 to 5, wherein the natural state of the lens is the second state and in this state no potential difference is applied between electrodes of the lens.
10. The sunglasses of claim 9, wherein the first fluid is the fluid nearest the rear wall, whilst the second fluid is the fluid having a boundary nearest the front wall.
11. The sunglasses of claim 10, wherein the first fluid is a transparent polar and/or conductive fluid, whilst the second fluid is a colored non-conductive fluid.
12. The sunglasses of claim 10 or 11, wherein the thickness of the second fluid within an optical path area of the lens may be continuously varied by varying the potential difference between electrodes.
13. The sunglasses of any preceding claim, wherein progressive variation of the potential difference between the electrodes is arranged to progressively alter the shape of the boundary to provide a progressive alteration between the first and second states.
- 25 14. The sunglasses of any of claims 1 to 3, wherein a hydrophobic insulator (130) is formed on an interior region of the rear wall (110) and also on a transparent rear electrode (160).
- 30 15. The sunglasses of claim 14, wherein the first fluid is the fluid which, in the first state, has a boundary nearest the front wall (120), whilst the second fluid is the fluid having a boundary nearest the rear wall (110).
16. The sunglasses of claim 15, wherein the first fluid is a transparent polar and/or conductive fluid, and the second fluid is a colored non-conductive fluid.

17. The sunglasses of claim 16, wherein the application of a potential difference between the electrodes causes the second fluid to be pushed toward side regions of the lens.
- 5 18. The sunglasses of any preceding claim, wherein the curvature of the front wall (120), the curvature of the rear wall (110) and the refractive index of the first and second fluids are arranged so as to correct a visual defect of a wearer.
- 10 19. The sunglasses of any preceding claim, wherein manual adjustment means are provided for altering the potential difference applied between the pairs of first and second electrodes.
- 15 20. The sunglasses of any preceding claim, wherein automatic adjustment means are provided for altering the potential difference applied between first and second pairs of electrodes.
21. The sunglasses of any preceding claim, wherein the first and second fluids are of substantially the same refractive index and specific gravity.
- 20 22. Electro-wetting lens incorporating first and second immiscible fluids of dissimilar light transmission properties, the first fluid being a better light transmitter than the second fluid, wherein variation in the potential difference between first and second electrodes of each electro-wetting lens causes the shape of a boundary between the first and second fluids to alter from a first state in which the second fluid forms a layer across substantially an entire light transmitting area of an internal surface of the lens and light transmission is at a most reduced state to a second state in which light transmission is at a maximum.
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